

### REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim 1 is requested to be cancelled.

Claims 11-18 are withdrawn.

Claims 2-5 are currently being amended.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 2-18 are now pending in this application, with claims 11-18 being currently withdrawn from consideration.

Claims 1, 2, 4, 6, and 9 stand rejected under 35 U.S.C. 103(a) as allegedly being obvious over Suzuki et al. (U.S. Patent No. 5,849,254). Applicants respectfully traverse this rejection for the reasons set forth below.

Claim 1 has been cancelled herein and claim 2 has been amended in independent form to include all the limitations of claim 1. The Examiner takes the position that an upper layer of Suzuki is considered to be the catalytic component I, and a lower layer of Suzuki is considered to be the catalytic component II, and thus claims 2, 4, 6, and 9 are unpatentable over Suzuki.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA 1974). See MPEP §2143.03. As set forth herein, Suzuki fails to disclose or suggest the instantly claimed invention.

According to claim 2 of this application, the catalyst component I is mainly contained in a first catalyst portion and the catalyst component II is mainly contained in a second portion which is formed on the first catalyst portion. That is, the catalyst component I containing Cu oxide and Zn oxide is in the first catalyst portion, and the catalyst component II containing metal oxide and one of Pt and Pd is a second portion which is formed on the first catalyst portion.

In use, a mix gas including methanol and oxide contacts the second catalyst portion which is formed on the first catalyst portion and contains catalyst component II. The catalyst component II accelerates a partial oxidation reaction, thus generating  $H_2$  and CO. The reduction gases (i.e.  $H_2$ , CO) then contact the catalyst component I in the first catalyst portion. As the catalyst component I is reduced by the reduction gases, and thus activated, the activated catalyst component I accelerates a steam reforming reaction. Further, while the partial oxidation reaction generates heat, the reforming reaction is an endothermic reaction. Therefore the heat generated by the partial oxidation reaction can apply to the reforming reaction.

In contrast, Suzuki discloses that oxide of Fe, Co, Ni, Cu or Mn is contained in the surface layer which is located on a NO<sub>x</sub> absorber and noble metals. Fig. 3 of Suzuki, for example, shows that upper layer 6 contains  $Fe_2O_3$  (60) as a metal-oxide, and lower layer 5 contains platinum (50). Suzuki teaches that the upper layer (i.e. the surface layer) includes oxide of Fe, Co, Ni, Cu or Mn which function to oxidize  $SO_2$  into  $SO_3$ , and the metal oxides take in  $SO_3$  and  $H_2SO_4$  to form salt of SO<sub>x</sub>, and therefore SO<sub>x</sub> does not reach the NO<sub>x</sub> absorber of the lower layer. Accordingly, the NO<sub>x</sub> absorber is prevented from generating salts of SO<sub>x</sub>.

Suzuki teaches that the order of the layers is very important because the layer containing the oxide of Fe, Co, Ni, Cu or Mn should be formed on the NO<sub>x</sub> absorber and noble metal to prevent the generation of salts of SO<sub>x</sub> in the NO<sub>x</sub> absorber. If the layer containing oxides of Fe, Co, Ni, Cu or Mn is located under the NO<sub>x</sub> absorber, the NO<sub>x</sub> absorber cannot prevent generating the salt of SO<sub>x</sub> in the NO<sub>x</sub> absorber.

Therefore, Suzuki does not disclose or suggest claim 2, as amended, as there is no motivation for changing the order of layers in order to form the methanol reforming catalyst set forth in claim 2.

With respect to claim 6, the Examiner's position appears to be that this claim would have been obvious over Suzuki because Suzuki teaches that the first catalyst layer contains Pt and the third catalyst layer also contains Pt and Rh.

The methanol reforming catalyst of claim 6 comprises a catalyst component I including Cu oxide and Zn oxide. Suzuki discloses Zn, however Zn is used as a metal loading to the noble metal catalyst. The Zn suppresses oxidation of SO<sub>2</sub>. The Zn is employed in a catalyst according to a first aspect. Suzuki also discloses Cu oxide, however, the Cu oxide is employed in a catalyst according to a second aspect. The catalyst according to the first aspect is different from the other catalyst according to the second aspect. Suzuki does not disclose or suggest to include Zn oxide. Further, Suzuki does not suggest or teach using Cu oxide and Zn oxide at the same time. Accordingly, as claim 6 would not be obvious to a person skilled in the art, the rejection should be withdrawn. Since claims 4 and 9 depend from claims 2 and 6, respectively, for at least these reasons claims 4 and 9 are also patentable over Suzuki.

Claims 3, 5, 7-8, and 10 stand rejected under 35 U.S.C. 103(a) as allegedly being obvious over Suzuki in view of Takahata *et al.* (U.S. Patent No. 5,376,610). Applicants respectfully traverse this rejection for the reasons set forth below.

Regarding claim 3, the Examiner admits that Suzuki does not disclose Cu, Zn, metal oxide, and one of Pt and Pd dispersed and mixed together as claimed. However, the Examiner concludes that claimed invention is obvious, relying on Takahara for the teaching that Pt and/or Pd are effective catalytic components.

As set forth above, in Suzuki the layer including oxide of Fe, Co, Ni, Cu or Mn controls a diffusion of SO<sub>x</sub> to the NO<sub>x</sub> absorber and prevents the generation salts of SO<sub>x</sub> in the NO<sub>x</sub> absorber. Therefore this metal oxide layer must be located up stream of the NO<sub>x</sub>

absorber. There is nothing in Takahata that would cure these deficiencies in Suzuki. As such, claim 3 is patentable over this combination of references.

With respect to claim 7, as set forth above, Suzuki does not disclose a structure in which three catalyst layers are laminated in a vertical direction. As explained above, in Suzuki the layer containing the oxide of Fe, Co, Ni, Cu or Mn should be formed on the NOx absorber and noble metal in order to prevent the generation of salts of SOx in the NOx absorber. Therefore, Suzuki does not disclose or suggest the methanol reforming catalyst as set forth in claim 7. There is nothing in Takahata that would cure these deficiencies in Suzuki. As such, claim 7 is patentable over this combination of references.

With respect to claims 5, 8 and 10, these claims depend from claims 2, 6 and 6, respectively. Suzuki does not disclose or suggest the methanol reforming catalyst as set forth these claims. There is nothing in Takahata that would cure these deficiencies in Suzuki. As such, for at least these reasons claims 5, 8 and 10 are patentable over this combination of references.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date 18 November 2003

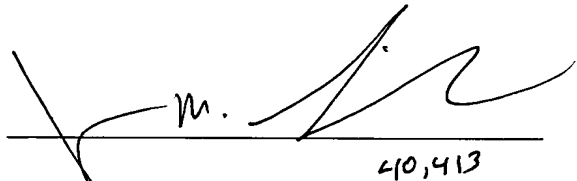
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By

A handwritten signature in black ink, appearing to read 'M.' followed by a stylized flourish, is written over a horizontal line. To the right of the signature, the number '410,413' is handwritten.

for Richard L. Schwaab  
Attorney for Applicant  
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